

( \* =mandatory field)

- **Investigator:\*(- )**
  - **Name\*:** Dr. Francisco Chavez
  - **Organization:** MBARI
  - **Address:**
    - MBARI
    - 7700 Sandholdt Rd
    - Moss Landing, CA 95039 USA
  - **Phone:** 831-775-1709
  - **Email:** chfr@mbari.org
- **Dataset\_Info:\*(- )**
  - **Dataset\_ID\*:** TAO155W\_0\_Jun05\_Aug08
  - **Submission\_Dates:\*(- )**
    - **Initial\_Submission:** 20091001 (YYYYMMDD)
    - **Revised\_Submission:** (YYYYMMDD)
- **Cruise\_Info:\*(- )**
  - **Experiment:( - )**
    - **Experiment\_Name\*:**
    - **Cruise:( - )**
      - **Cruise\_ID:** (EXPOCODE)
      - **Section:** (Leg)
      - **Geographical\_Coverage:\*(- )**
        - **Geographical\_Region:**
        - **Bounds:\*(- )**
          - **Westernmost\_Longitude:**  
Enter decimal fractions of degrees: -155 (+ = E, - = W)  
or Degrees, Minutes, Seconds:
          - **Easternmost\_Longitude:**  
Enter decimal fractions of degrees:  
or Degrees, Minutes, Seconds:
          - **Northernmost\_Latitude:**  
Enter decimal fractions of degrees: 0 (+ = N, - = S)
          - **Southernmost\_Latitude:**  
Enter decimal fractions of degrees:
    - **Temporal\_Coverage:( - )**
      - **Start\_Date:** 20050616 (YYYYMMDD)
      - **End\_Date:** 20080814 (YYYYMMDD)
  - **Vessel:\*(- )**
    - **Vessel\_Name:**
    - **Vessel\_ID:**
    - **Country:**
    - **Vessel\_Owner:**

Platform Identifier: Mooring

Mooring Location

Longitude: Enter decimal fractions of degrees: -155 (+ = E, - = W)

Latitude: Enter decimal fractions of degrees: 0 (+ = N, - = S)

Start\_Date: 20050616 (YYYYMMDD)

End\_Date: 20080814 (YYYYMMDD)

- **Variables\_Info:\*(- )**
  - **Variable:( - )**
    - Variable\_Name\*: (show pick list)
    - Description\_of\_Variable: (E.g., in dry air)

**\*\*General notes:**

- All measurements are at sea surface temperature and atmospheric pressure.
- This data sets covered many deployments and the system was calibrated before and after each deployment. There were periods when the system did not function properly resulting in a data gap until the next deployment. The dates of buoy recovery and deployment are shown below:

Date deployed	Date recovered
---------------	----------------

6/17/2005	10/26/2005
-----------	------------

10/26/2005	6/6/2006
------------	----------

6/7/2006	10/13/2006
----------	------------

10/13/2006	7/19/2007
------------	-----------

7/20/2007	2/8/2008
-----------	----------

2/8/2008	8/14/2008
----------	-----------

- During the equilibration cycle, a closed loop of air equilibrates with seawater. Once the equilibration period is complete, the pump stops and the system opens to the atmosphere allowing the pressure to equilibrate with atmospheric pressure before the measurement is made.
- During the air cycle, fresh air is pumped through the detector. Once the pump stops, the system opens to the atmosphere allowing the pressure to equilibrate with atmospheric pressure before the measurement is made.
- The gas streams for both the air cycle and equilibrator cycle are partially dried before entering the detector. The marine air runs the reference cell and the equilibrated air runs through the sample cell. The Licor is directly reading the delta pCO<sub>2</sub>.
- Sampling occurs every 1-3 hours. Data are transmitted back daily.
- As a final step in the QC process, each data set is compared with the Marine Boundary Layer data from GlobalView-CO<sub>2</sub>. Comparisons between data sets when direct atmospheric measurements were made and the GLOBALVIEW estimates indicate that the absolute average differences are on the order of 1 ppm and are largely due to random noise. Occasional small excursions the might be related to different air masses can be observed but they tend to be less than 2 ppm.

GLOBALVIEW-CO 2: Cooperative Atmospheric Data Integration Project - Carbon Dioxide. CD-ROM, NOAA CMDL, Boulder, Colorado [Also available on Internet via anonymous FTP to ftp.cmdl.noaa.gov, Path: ccg/co2/GLOBALVIEW], 2005

**Measured Information: (Variable Name/Description)**

Pressure of Licor (hPa) and Atm – Atmospheric pressure at the airblock, 4 feet above the sea surface

**Derived Parameters:**

xCO<sub>2</sub> SW (dry) (umol/mol) – Mole fraction of CO<sub>2</sub> in air in equilibrium with the seawater at sea surface temperature (dry air).

xCO<sub>2</sub> Air (dry) (umol/mol) – Mole fraction of CO<sub>2</sub> in air at the airblock, 4 feet above the sea surface (dry air).

fCO<sub>2</sub> SW (sat) uatm – Fugacity of CO<sub>2</sub> in air in equilibrium with the seawater at sea surface temperature (100% humidity). Since the measurements are taken at the sea surface, warming calculations are not necessary.

fCO<sub>2</sub> Air (sat) uatm – Fugacity of CO<sub>2</sub> in air at the airblock, 4 feet above the sea surface (100% humidity).

dfCO<sub>2</sub> – Difference of the fugacity of the CO<sub>2</sub> in seawater and the fugacity of the CO<sub>2</sub> in air (fCO<sub>2</sub> SW - fCO<sub>2</sub> Air).

- **Method\_Description:\*(-)**

- **Equilibrator\_Design:(-)**

- Equilibrator\_Type: (show pick list) Bubble Equilibrator
    - Equilibrator\_Volume: (L) N/A
    - Water\_Flow\_Rate: (L/min) N/A
    - Headspace\_Gas\_Flow\_Rate: (L/min) ~600 cc/min
    - Vented: (show pick list) Yes

- Measurement\_Method: Dual-cell, non-dispersive infrared (NDIR) gas analyzer

- Manufacturer\_of\_Calibration\_Gas:

- **CO<sub>2</sub>\_Sensors:(-)**

- **CO<sub>2</sub>\_Sensor:(-)**

- Manufacturer: Licor
      - Model: Environmental\_Control: LI-820
      - Resolution: 0.01 ppm
      - Uncertainty: < 2.5% of reading with 14 cm bench (stated)  
<1.5 ppm determined in lab
      - CO<sub>2</sub>\_Sensor\_Calibration: (For each calibration gas, document traceability to an internationally recognized scale, including date and place of last calibration. Include uncertainty of assigned value.)

Before and after each deployment, the licors are calibrated in the lab. At the beginning of each sample, the instrument self-calibrates using a zero standard. The zero standard is generated by cycling a small amount of air through a soda lime chamber.

- Method\_References: (Publication(s) describing method)

Friederich, G.E., P.G. Brewer, R. Herlein, and F.P. Chavez (1995). Measurement of sea surface partial pressure of CO<sub>2</sub> from a moored buoy. [Deep-Sea Research](#), 42, 1175-1186.

Chavez, F.P., J.T. Pennington, R. Herlien, H. Jannasch, G. Thurmond and G.E. Friederich (1997) Moorings and drifters for real-time interdisciplinary oceanography. [Journal of Atmospheric and Oceanic Technology](#) **14**, 1199-1211.

- Data\_set\_References: (Publication(s) describing data set)

Chavez, F.P., P.G. Strutton, G.E. Friederich, R.A. Feely, G.A. Feldman, D. Foley, and M.J. McPhaden. (1999) Biological and chemical response of the equatorial Pacific Ocean to the 1997 and 1998 El Niño. [Science](#) **286**, 2126-2131.

- Citation: (How to cite this data set)

- **Data\_Set\_Link:(-)**

- URL\*:(m s t)

- Label\*:(m s t)

- Link\_Note: (Optional instructions or remarks)(m s t)